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RANGE IMPROVEMENT

VOL. 7, NO. 4

NOTES

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(AGRI - OGDEN)

PUBLISHED BY INTERMOUNTAIN REGION, FOREST SERVICE., U.S. DEPT. AGRICULTURE., OGDEN, UTAH

STATEMENT OF PURPOSE

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This publication is printed primarily to inform professional range administrators of important range improvement and management developments and findings. These "Notes" may include extracts of published papers, unpublished preliminary reports of research work, unpublished reports on administrative studies and personal observations or suggestions of other range administrators. No claim is made as to the accuracy or completeness of studies or conclusions drawn.

All who read these RANGE IMPROVEMENT NOTES are encouraged to submit material for publication, or suggestions for improving its usefulness. Full credit will be given for any material used.

THE INTERMOUNTAIN HERBARIUM OFFERS MANY SERVICES

Arthur H. Holmgren 1/

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The dictionary defines an herbarium as "a collection of dried and pressed specimens of plants, usually mounted or otherwise prepared for permanent preservation, and systematically arranged." The Intermountain Herbarium at Utah State University contains more than 100,000 plant specimens that have been collected over the years, identified, classified, and filed in cases in a systematic and universal system used in major herbaria throughout the world. A few of these specimens were collected as early as 1840 and are still in a perfect state of preservation. Most of the plants represent species collected in the Intermountain Region.

New plants continually being added

Only one thing is certain after more than thirty years of systematic collecting. Our herbarium still does not contain specimens of all flowering plants growing spontaneously in the Intermountain Region. We find new weed introductions from time to time, or we discover plants known from other areas and collected here for the first time, thus giving us what we call "range extension." Or we may find a plant that is new to science, a species that has never been named and described. Most extensive field trips may be expected to turn up one or more of these new records; so the task of doing field work is seemingly without end.

An inventory of plant species

What is the value of all these plant specimens? They represent a considerable investment. Their uses are many. First of all, the herbarium is an inventory of the plant resources of our area. The specimens furnish proof of the species found in our flora. Carefully identified specimens become comparative material in identifying plants. These specimens are also important as teaching material to students in agronomy, botany, range management, or

1/ Arthur H. Holmgren is associate professor of botany and curator of the Intermountain Herbarium. Vol. 23, No. 2, June 1962
UTAH FARM-HOME SCIENCE, Agricultural Experiment Station -
Utah State University, Logan, Utah.

other related fields. Loans of certain groups of plants are made to other institutions and to scientists engaged in monographic studies. Likewise, we often find it necessary to borrow specimens for our studies from one or more institutions in the country.

Herbarium specimens become the cornerstone of different types of botanical publications. Two publications of importance to farmers and ranchers in Utah are WEEDS OF UTAH and IMPORTANT POISONOUS PLANTS OF UTAH. Specimens in the Intermountain Herbarium give documented evidence that the species included in these studies are found in our area. Our most important objective continues to be the writing and illustrating for the publication entitled THE ILLUSTRATED FLORA OF THE INTERMOUNTAIN REGION. This work will include keys, illustrations, and descriptions of all vascular plants known to occur in the Intermountain Region. The plant specimens on file in the Intermountain Herbarium will determine most of the nearly five thousand species included in the publication.

Identification service of economic value

The identification service of the herbarium staff is important and may be of considerable economic value. We are often asked to identify a plant suspected as being poisonous to some class of livestock. This entails considerable responsibility, as financial losses may be averted by a right answer. Accurate identification of noxious weeds can bring about early and successful control measures before these plants become established and widespread. Two important poisonous plants from Idaho ranges were recently identified for Dr. Wayne Binns of the U. S. Agricultural Research Service who is working on poisonous plants and parasitic diseases of livestock. False hellebore (Veratrum californicum, Dur.) has proved to be the plant causing the disorder in lambs known as monkey face. A less severe condition in new-born calves called crooked leg is caused by a lupine (Lupinus). Costly livestock losses in the Uintah Basin have been due to a plant identified as Astragalus pubentissimus T. & G., one of the loco weeds. These are but a few of many examples where the identification services of the herbarium have been of economic value in the first phase of research in poisonous plant problems.

Numerous noxious weeds have been identified since the Intermountain Herbarium was established. Two recent examples here are squarrose knapweed (Centaurea virgata Lam. var. squarrosa (Willd.) Boiss.)

and Austrian field cress (Rorippa austrica (Crantz) Bess.).
Control measures started soon after a species is introduced into
an area have a good chance for success, and further dissemination
of the species may be prevented.

Identification of the species is always the first step in any research
work on plants. In this area also, the Intermountain Herbarium
is continuing to be important in numerous ways to many people.

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When people get to rubbing you pretty hard

just remember

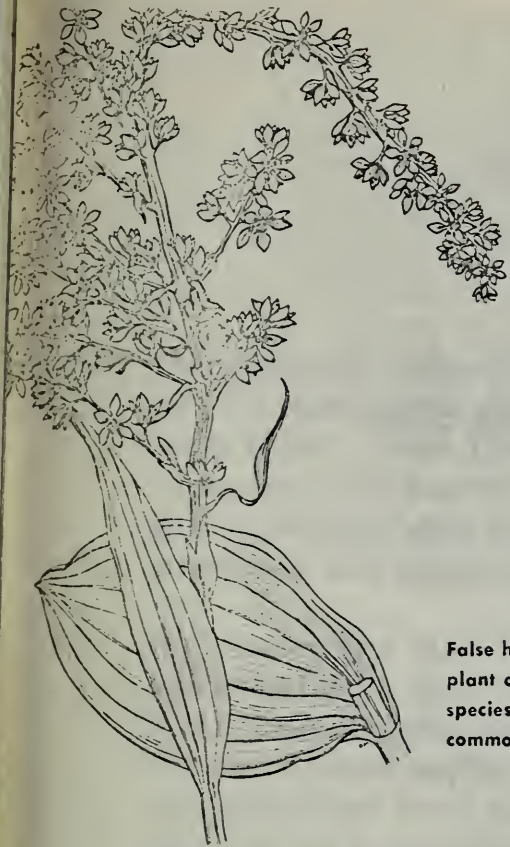
That's the treatment that puts a polish on things.
--"The Country Sage"

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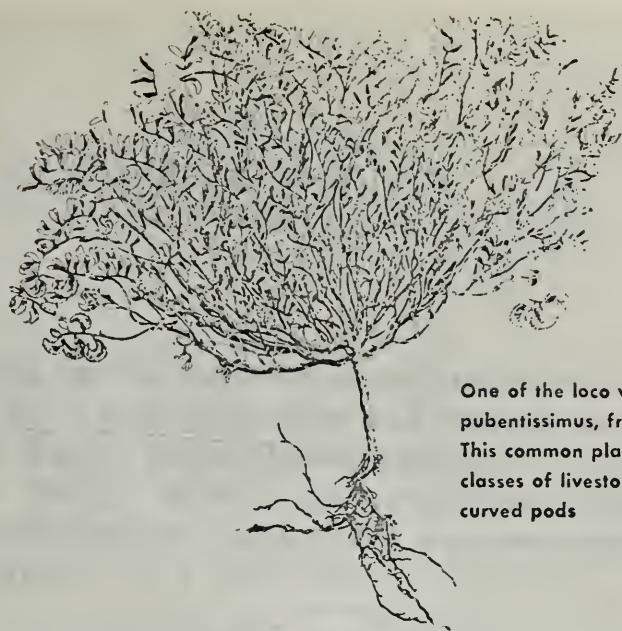
Always remember
A good place to find a helping hand
is at the end of your arm.
--H. F. Banks

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We blame in others
only the faults by which we do not profit.
--Alexander Dumas (père)

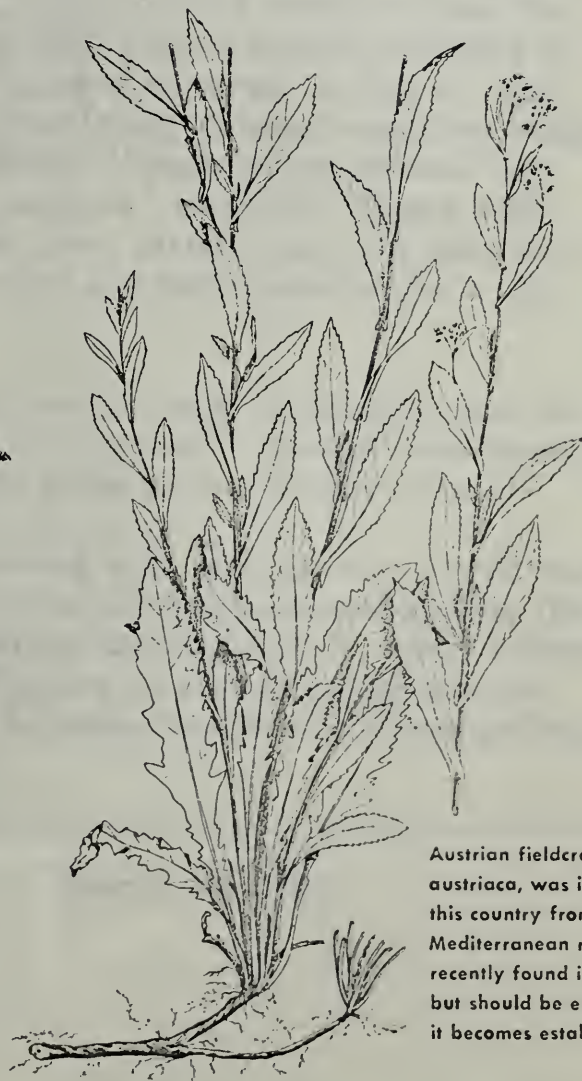
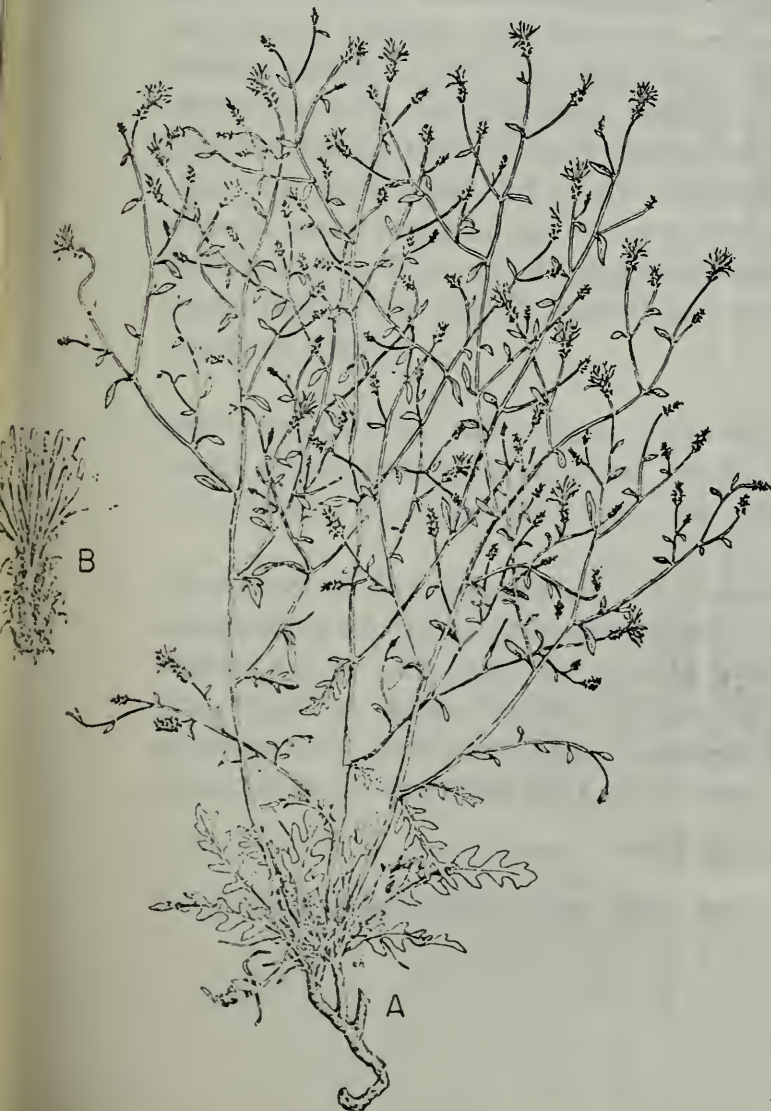


False hellebore, *Veratrum californicum*, is the plant causing monkey face in lambs. This species is a member of the lily family. It is a common sight in mountain meadows



One of the loco weeds, *Astragalus pubentissimus*, from the Uinta Basin. This common plant is poisonous to all classes of livestock. Note the hairy, curved pods

Squarrose knapweed, *Centaurea virgata* var. *squarrosa*, showing habit of plant and detail of head. This noxious weed was recently introduced into Juab County



Austrian fieldcress, *Rorippa austriaca*, was introduced into this country from the Mediterranean region. It was recently found in Sevier County, but should be eradicated before it becomes established

COLLECTING RAINFALL MAY HAVE POSSIBILITIES*

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Percolation, seepage and evaporation make lakes and reservoirs of all types highly inefficient as water collectors and storage units, says C. W. Lauritzen, USDA Agricultural Research Service soil scientist, stationed at Logan, Utah. Most of the precipitation that falls, particularly in low-rainfall areas, enters the soil and never produces any appreciable runoff.

By covering a land area with a nonabsorbent, watertight material, essentially all precipitation can be saved, he points out. There are a number of materials which might be used for such ground covers. These include asphalt, plastic and butyl rubber. Chemical soil sealants also have possibilities, but only a fraction of the total rainfall can be saved with such compounds at the present time.

In his view, the most promising ground cover materials are 30-mil butyl sheeting and an asphalt-coated jute liner similar to that used for lining canals. Of the two, the asphalt-sheet structure has the lowest initial cost, he reports. Ground covers can be installed to intercept and concentrate rainfall in several ways, he says. One method being tested consists of covering an isolated smoothed slope that has been cleared of all vegetation. Grade is not critical but should be steep enough to prevent surface retention. Under most conditions a five-percent grade has been satisfactory. It should be protected from heavy runoff overwash and sedimentation by a diversion dike.

Once rainfall is collected, conventional storage structures such as tanks or reservoirs may be used, he explains. Special consideration, of course, must be given to prevent seepage and evaporation.

The cost of developing water resources with ground covers will vary, depending on local precipitation, initial cost of material and its life expectancy. Though cover life span is hard to project, butyl rubber sheeting has been known to last 10 years as a ditch lining without measurable deterioration, except for some mechanical damage from livestock, according to Lauritzen.

* UTAH FARMER, Vol. 81, No. 6, March 15, 1962

Ground covers with a 10-year life expectancy can be installed for \$1 per square yard, he says. At 7 percent interest, the amortized cost of collecting water in an 8-inch rainfall region would be \$3.10 per 1,000 gallons. In areas with 12 inches of precipitation, the cost would be \$2.08; 18 inches, \$1.37.

Storage costs are not included in these figures as this would be a necessary expense of any intermittent water supply, regardless of source.

According to Lauritzen 1 acre-inch of rain will yield about 27,000 gallons of water - enough for 270 head of cattle for 10 days. At a cost of \$3.10 per 1,000 gallons, this represents less than 3 cents per day per cow for water, he estimates. Even doubling this figure to satisfy the additional cost of storage, a per-head charge of 6 cents a day for water is still cheap if it makes possible utilization of rangeland that otherwise could not be grazed.

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Some men never master anything
other than the details of a job.
Others master the main idea back of the job.
--William Feather

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The common characteristics of people
make a community possible,
BUT
it is the UNCOMMON QUALITIES that
MAKE IT BETTER.
--John H. Fisher

Conclusions and Summary from
TECHNICAL PAPER NO. 64 (1961)
of the Pacific Southwest Forest and Range Experiment Station
entitled

WHEN TO PLANT BITTERBRUSH - SPRING OR FALL?

By Richard L. Hubbard and H. Reed Sanderson,
Range Conservationists

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"Should bitterbrush be planted in the spring or in the fall?" The answer varies with site and rainfall. Results of spring-fall planting comparisons in northeastern California, on a variety of sites and spread over 7 different growing seasons, show that spring planting is superior to fall planting on many sites.

For planting success the soil at planting depth must remain moist during germination and emergence. Emergence is usually 3 to 4 weeks later from spring planting than from fall. Fall-planted seed is in the ground ready to germinate as soon as the soil warms up. This means that the soil must remain moist longer for spring plantings to succeed. Either, or both, of two conditions must be met to provide this longer moist period. Precipitation must be adequate and well distributed during the critical period and the soil must retain moisture well. Loam soils as a rule retain moisture rather well; coarse sands lose moisture rapidly.

Fall planting may be best in very dry years on sites normally adapted to spring planting. With present weather forecasting, this point may be academic since we can classify sites only on the basis of average precipitation. But with continued advances in long-range forecasting, the land manager, may, in time, have enough information to foresee the best planting schedule. If fall planting is necessary, increases in seeding rate and, consequently, costs may be necessary. Perhaps the decision should be not to plant in dry years.

On normally dry sites, spring planting will usually fail. Here, the only possibility is to plant in the fall.

The reasons for the superiority of spring planting are incompletely understood. Spring-planted seed is exposed for a shorter period of time. Rodents have less time to dig up the seed and also rodent numbers are at their seasonal low. The heaviest rodent use of bitterbrush seed seems to be after the seed starts to germinate. Fall-planted bitterbrush seed germinates earlier than the seed of many

of the herbaceous species. Perhaps the lack of other food attracts the rodents to the early germinating bitterbrush seed. Lack of food may also be responsible for heavy insect attacks. Frost action may replant fall-planted seed at either too shallow or too deep depths. Emergence of spring-planted seed from deeper depths may also help explain the superiority of spring planting. Whatever the reasons, our experimental results have established the superiority of spring planting on the moister sites.

Seedlings from spring plantings are consistently smaller than those from fall plantings. But no more of them die. Despite their somewhat smaller size, the seedlings from spring plantings are healthy, have well developed root systems, and are capable of competing and growing successfully in following years.

Spring planting is a tightly-scheduled job. The seeding crew must start just as soon as the ground thaws and weather permits. The job must be completed within 2 or 3 weeks. Fall planting can be spread out over several months. Despite the operational difficulties, we recommend spring planting on suitable sites. Results from spring planting have been enough better to fully justify this recommendation. We do not recommend spring planting on sites where soil moisture is inadequate for germination. Here, fall planting is the only possibility.

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There is nothing
on which
men are commonly more intent
than on
making a way for their opinions.
--Montaigne

MORE FORAGE FROM GREAT PLAINS RANGELAND*

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An effective way to spread available runoff water, combined with judicious use of nitrogen fertilizer, more than doubled forage production in experiments on dry native rangeland in the Northern Great Plains.

This research showed that available moisture largely determines how much fertilizer the grasses will use - and that applications of fertilizer are needed to assure efficient use of limited moisture in the area.

These studies to test the value of fertilizer used in combination with water spreading to supply additional moisture were conducted by ARS Soil Scientist H. R. Cosper. He worked near New Underwood, South Dakota in cooperation with USDA's Soil Conservation Service and the South Dakota Agricultural Experiment Station.

(Water spreading is a means of concentrating runoff and delivering it to range reserved for hay production. A typical installation consists of an earth dam to trap runoff, and a system of dikes and ditches to store and distribute the water by gravity)

Cosper applied nitrogen fertilizer in the fall to range predominantly in western wheatgrass and needlegrass, then measured production of dry forage the following two seasons.

Application rates were 40, 80, and 160 pounds of fertilizer per acre. In the first year after fertilization, the check plot yielded 985 pounds per acre. Yields from fertilized plots were 1,640, 2,400, and 2,660 pounds per acre, respectively.

All yields dropped the next year, because precipitation in winter was so limited there was no runoff to spread. Even so, fertilizer boosted yields. The check plot yielded 581 pounds an acre. Plots getting 40, 80, and 160 pounds of fertilizer yielded 919, 807, and 1,051 pounds.

* AGRICULTURAL RESEARCH - November 1961

Total increases in yield on the test plots for the 2 years following nitrogen application were 63, 105, and 135 percent.

Fertilized grass also had a higher crude protein content - increases in crude protein were 65, 133, and 207 percent.

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SAFETY MESSAGE

While we are working at improving our driving habits.

SIT IN THE SAFETY BELT - NOT ON IT.

Safety belts can conceivably break in a severe crash

BUT

they will already have served to prevent you from
landing against something - with at least a
TON AND A HALF LESS FORCE!

The primary cause of accidents is still poor driving habits.

Even if we belt every driver and passenger we
will still be faced with accidents.

FENCES

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"It is much cheaper to use pressure-treated pine posts than native nondurable posts, even if you get the native posts for nothing."

The above quotation is from the August 1959 issue of WOOD PRESERVING NEWS, reporting on an article in the South Dakota Forestry Notes of April 1, 1959, by Extension Forester E. K. Jim Ferrell of South Dakota State College of Agriculture.

The article further quotes Mr. Ferrell: "Home-treated native posts are about on the same level of durability as untreated northern white cedar posts. Should cedar be mostly sapwood, then the home-treated posts would be better."

These statements are substantiated by average annual costs per mile of fencing in South Dakota (including cost of posts and labor) as tabulated below:

Service Life and Costs of Fence Posts Installed
(6-1/2 ft. x 4 in. round)

<u>Species of Wood</u>	<u>Cost Per Mile</u>	<u>Life In Years</u>	<u>Annual Cost Per Mile</u>
Native Nondurable	\$233	3	\$78
Native Nondurable Home Dipped	\$349	15	\$23
Northern White Cedar	\$316	15	\$21
Pressure-Treated Ponderosa Pine	\$419	30*	\$14

* WOOD PRESERVING NEWS note - Very conservative estimate. Hundreds of service records show an average life well beyond 35 years.

The Ferrell article is based on the Forest Products Laboratory 1959 Progress Report of Report No. 1757 "Comparison of Wood Preservatives in Mississippi Post Study."

A commercial standard CS 235-61 for pressure-treated wood fence posts (with oil-type preservatives) is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price 15 cents.

PLASTIC PONDS SAVE WATER*

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After hauling water 20 miles up a canyon to over 300 head of cattle for more than ten years, ranchers of the Minersville Land & Livestock Cattle Association down in Beaver County, Utah, decided something had to be done about it.

And they did do something! Through a cooperative effort with the Bureau of Land Management, Soil Conservation District, and Agricultural Research Service, they installed a plastic-lined stock pond. The first year of use showed that this pond will nearly pay for itself every year that it fills.

The Minersville Land & Livestock Cattle Association is a range cattle allotment. The lands used consist of private, State, and Federal land, the latter making up the major portion.

An area of 2,025 acres of rangeland about 20 miles south and east of Minersville was cleared of brush and planted to crested wheatgrass in 1954 by the BLM. The stand established and produced well, but lack of adequate water made proper management and use very difficult. The closest water was two miles, and this supply was not sufficient for the whole grazing season during dry years.

In order to make better use of the crested wheatgrass and distribute cattle over the whole area, the Association, as noted, had hauled water by truck to the seeding during the summer grazing seasons.

The trip up rough steep mountain roads with 1,000 to 1,500 gallons of water per trip was a very expensive operation. Ross Marshall, one of the Association members working with this operation figured it cost about \$1.35 per cow per month for water hauling!

In the summer of 1960, Ralph Pearson, the Association president, requested assistance from the local Twin-M Soil Conservation District and was informed by SCS technician Kenneth L. Williams that a plastic-lined pond might solve the problem. A stock pond had not been considered practical in the past, because no major water

* Vol. 80, No. 15., IDAHO FARMER, August 2, 1962

drainages entered the area where water was needed. Thus, adequate water could not be stored to overcome seepage losses and provide stock water.

The matter was given further study. Dr. C. W. Lauritzen of the Agricultural Research Service at Utah State University gave needed information on vinyl plastic pond linings, and installation. The vinyl lining needed was found to cost about \$760. Other materials needed for construction included a deer and cattle fence around the pond, costing about \$200, and a water trough with a float valve costing about \$100. The labor for installing the above items was to be furnished by Association members.

Pratt Allred, District Manager, was contacted, and he agreed that the BLM would do the necessary earthwork in constructing the pond and installing the plastic pipeline.

A satisfactory site was selected, the pond was dug, and 500 feet of one and one-half inch plastic pipeline was installed. The ranchers followed by raking the pond smooth, laying the plastic and covering it with six inches of earth. This was accomplished by eight ranchers and equipment in one day.

An eight-foot high net wire fence was then constructed around the pond and the water trough and float valve were installed at the end of the pipeline. The completed pond was about 140 feet square, with an average depth of eight feet. The plastic lining covered only the lower half of the pond about 120 feet square. The total cost to the Association was about \$1060, plus labor.

The winter was dry; in February 1961, there was still no water in the pond. However, the pond did fill before spring. The water level dropped to the plastic lining in about two weeks, and there it remained with little loss until the cattle began using it later in the spring.

Through this method of conserving a small amount of water for maximum use, the supply lasted through the grazing season. It was calculated by the Association that this pond actually supplied water for about 175 cows for five months.

Using the before-mentioned figure of \$1.35 per cow per month for water hauling, the pond saved \$1,180 in 1961. This compares very

favorably with the \$1,060 cost of materials, and a few days labor furnished by the ranchers in constructing the pond.

The Association president says there will be many more of these ponds installed in areas where water has not been available in the past. The Association believes this will promote more uniform use of the range forage, and opens the way for a better range management program, which will benefit all users of this range.

--Keith J. Chapman, Soil Conservation Service

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Life is the garment we continually alter
but which never seems to fit.

- - - - -

CARS and BARS match

but

DON'T MIX.

